ABSTRACT

A toner cartridge of an image forming apparatus such as a laser printer, copier or facsimile machine uses a shipping seal assembly component so that the toner cartridge may be shipped to the end-user's location without leakage. One embodiment of this invention uses adhesive masking to reduce the magnitude of the pulling force required when pulling the pull-strip of a tear-seal assembly to tear the seal, thereby opening the toner passage to appropriately release toner so the toner cartridge may be initialized for use in an image forming apparatus. The adhesive masking may be further improved upon by using the very release liner, an ingredient of some adhesive tapes, that is already on the tape to mask the adhesive at the initial tearing and/or final tearing area, or any other location where the magnitude of the pulling force is to be reduced. This adhesive masking using the release liner can be even further improved by forming precise adhesive masking during the same die-cutting process when a component of the seal is formed, and thus does not require an extra step, but rather uses a die that does both functions of cutting a component and kiss-cut-forming an adhesive mask, all in one die-cut step. Thus, labor is saved. These seal assembly improvements may be implemented in the overall manufacture of a toner hopper, toner cartridge and/or an image forming apparatus. Seal assemblies may also employ permanently installed internal or external positioning supports, or externally installed removable positioning supports. The seal assemblies of this invention may include plastic, adherent, foam, a tear-able material layer, and/or a pull-strip. The adherent may consist of adhesive, glue, tape, transfer tape, caulk, tape with and/or without carrier or plastic in-between two adhesive surfaces, just to name some examples. The pull-strip may be formed using either tear-able material unitary with the tear-able material layer to be torn or optionally a separate tear-guide may be used that assures the minimum width of the tear. The optional tear-guide will allow the seal assembly to tear straighter without narrowing as it tears. The adhesive-masking may also be used to accurately and economically control the position of the initial tear of the tear-able material layer without requiring a pre-cut and/or to lower the magnitude of force required by the end-user to pull the tear-seal although it may also be used with pre-cuts. Seal assemblies may optionally be manufactured to be conductive or may have conductive coatings, for example, to prevent toner from sticking.